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Evidence of Increased Prostate Cancer Screening in Rhode Island

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Screening for cancer of the prostate is controversial. Used together, the digital rectal examination (DRE) and the prostate-specific antigen (PSA) blood test may be used to detect prostate cancer at early stages of disease, and clinical studies have revealed promising outcomes from prompt, state-of-the-art treatment following positive screening results. Additionally, since the introduction of the PSA test in 1986, mortality from prostate cancer has declined in the United States.[1] However, the contribution of screening to mortality decline is unproven, and will remain so until a major clinical trial is completed in 2017.[2]

Until that time, recommendations for prostate cancer screening may continue to be inconsistent, as follows:

- **American Cancer Society [Recommended]:** Both the PSA test and digital rectal examination (DRE) should be offered annually, beginning at age 50, to men who have at least a 10-year life expectancy. Men at high risk (African-American men and men with a strong family history of one or more first-degree relatives [father, brothers] diagnosed before age 65) should begin testing at age 45. Men at even higher risk, due to multiple first-degree relatives affected at an early age, could begin testing at age 40. Depending on the results of this initial test, no further testing might be needed until age 45. Information should be provided to all men about what is known and what is uncertain about the benefits, limitations, and harms of early detection and treatment of prostate cancer so that they can make an informed decision about testing. Men who ask their doctor to make the decision on their behalf should be tested. Discouraging testing is not appropriate. Also, not offering testing is not appropriate.[3]

- **National Cancer Institute [No recommendation]:** Benefits - The evidence is insufficient to determine whether screening for prostate cancer with PSA or DRE reduces mortality from prostate cancer. Screening tests are able to detect prostate cancer at an early stage, but it is not clear whether this earlier detection and consequent earlier treatment leads to any change in the natural history and outcome of the disease. Epidemiological evidence shows a trend toward lower mortality for prostate cancer in some countries, but the relationship between these trends and intensity of screening is not clear, and associations with screening patterns are inconsistent. The observed trends may be due to screening, or to other factors such as improved treatment. Harms - Based on good evidence, screening with PSA and/or DRE detects some prostate cancers that would never have caused important clinical problems. Thus, screening leads to some degree of overtreatment. Based on good evidence, current prostate cancer treatments, including radical prostatectomy and radiation therapy, result in permanent side effects in many men. The most common of these side effects are erectile dysfunction and urinary incontinence.[4]

- **U.S. Clinical Preventive Services Task Force [No recommendation]:** The evidence is insufficient to recommend for or against routine screening for prostate cancer using PSA testing or DRE. There is good evidence that PSA screening can detect early-stage prostate cancer but mixed and inconclusive evidence that early detection improves health outcomes. Screening is associated with important harms, including frequent false-positive results and unnecessary anxiety, biopsies, and potential complications of treatment of some cancers that may never have affected a patient's health. The current evidence is insufficient to determine whether the benefits outweigh the harms for a screened population.[5]

Because screening for prostate cancer has not been a cancer control priority in the United States, surveillance for prostate cancer screening has begun only recently. For example, the Behavioral Risk Factor Surveillance System (BRFSS) of the Centers for Disease Control and Prevention began collecting information about use of the PSA test in 2002, and collected additional information in 2004. At the time of the latter survey, the median state value for the proportion of men ages 40 and over who "had a PSA test in the past two years" was 52%, revealing widespread use despite lukewarm recommendations. Use varies by age, varying from 25% for men ages 40-49 to 75% for men ages 65 and over. The corresponding proportions for Rhode Island are statistically equivalent.[6]

Trends in incidence rates may also be used to assess the use of screening in a population. Of the two screening tests for prostate cancer, DRE has been a standard part of the complete physical examinations for decades. There is no reason to believe that DRE use has changed substantially of late. The PSA test, however, was introduced in 1986, and its

rapid introduction may increase incidence rates in two ways: first, by detecting some tumors that are undetectable with the DRE (because they are out of reach), and second, by detecting some tumors sooner than they would be detectable with the DRE, thus "heaping" several future years' diagnoses in the current year. When PSA screening for prostate cancer becomes routine, the heaping effect, which is not an effect of screening but rather of its rapid introduction, can be expected to subside.

An examination of prostate cancer incidence rates in Rhode Island by age, race, and ethnicity (Hispanic origin) was undertaken to look for evidence of the rapid introduction of the PSA in subsets of the population of resident men, ages 40 and over.

Methods. Age-specific prostate cancer incidence rates were constructed from prostate cancer case reports made to the Rhode Island Cancer Registry between 1 January 1987 and 31 December 2003 for men resident in Rhode Island (numerator data) and estimates of the population of men resident in Rhode Island during that period, based on U.S. census reports for 1990 and 2000 (denominator data). Age-specific rates were calculated for White men of all ethnicities, Black men of all ethnicities, and Hispanic men of all races, dividing the seventeen years of observation into early (1987-1995) and late (1996-2003) periods. The results were plotted by age group and period, controlling for race or ethnicity, to examine changes for evidence of the rapid introduction of prostate cancer screening.

Note on Classifying Prostate Cancer Cases as Hispanic: Data on resident prostate cancer cases identified as Hispanic were extracted from Rhode Island Cancer Registry case reports for the years 1987-2003 and aggregated by age group and year of event. Alternative counts of resident prostate cancer cases for Hispanics were estimated using a validated US Census technique for identifying Hispanics by surname.[7] Synthetic aggregates of prostate cancer cases for Hispanics were created by adding the additional cases classified as Hispanic on the basis of the name analysis to those cases identified as Hispanic in case reports.

Results. Figure 1 reveals a shift to the left in age-specific rates of prostate cancer incidence among White men of all ethnicities between the two periods, with increased incidence in younger age groups (through ages 65-69), and decreased incidence in older age groups (ages 70-74 and higher). The same is true of Black men of all

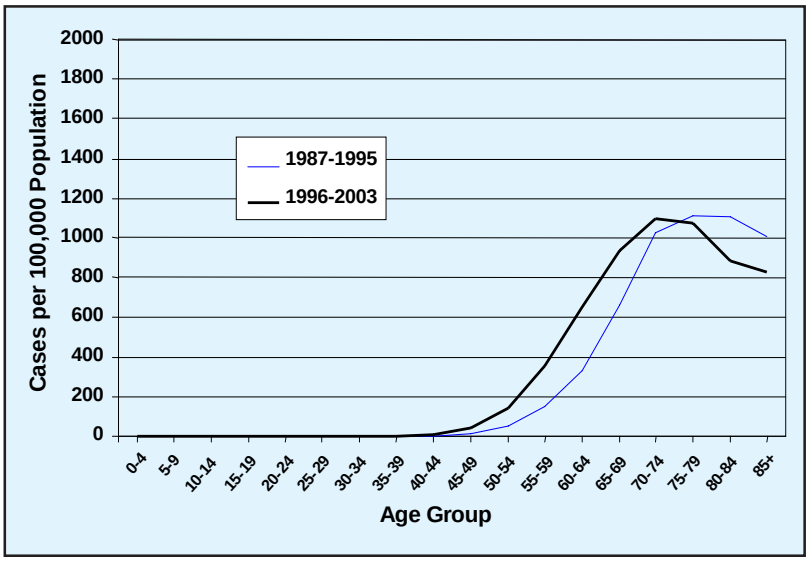

Figure 1. *Incidence of prostate cancer per 100,000 population, by age group, White males of all ethnicities, Rhode Island, 1987-1995 and 1996-2003.*

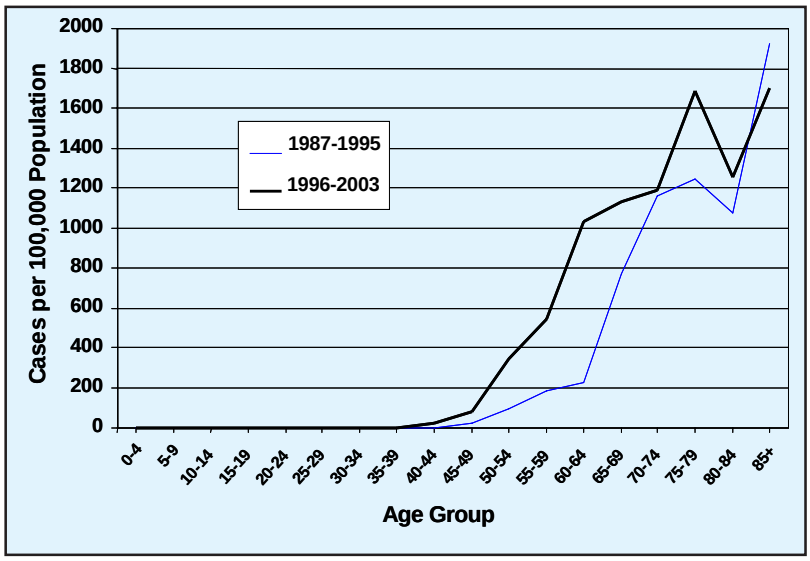

Figure 2. *Incidence of prostate cancer per 100,000 population, by age group, Black males of all ethnicities, Rhode Island, 1987-1995 and 1996-2003.*

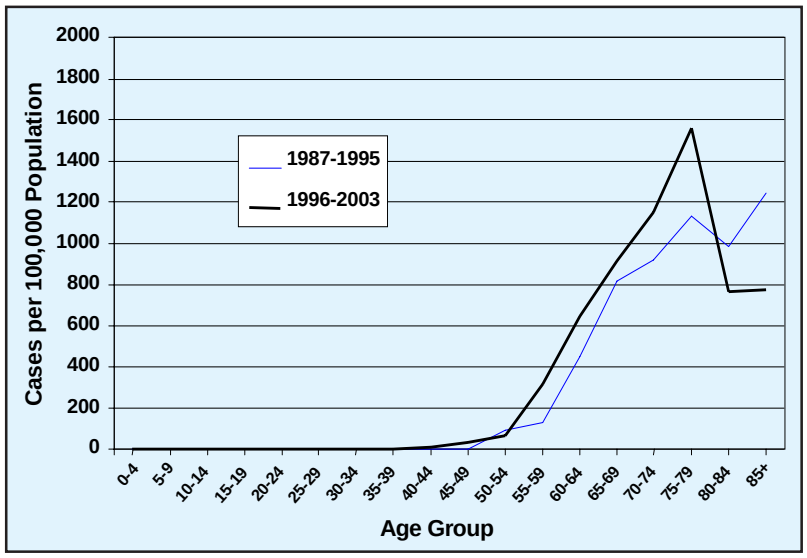

Figure 3. *Incidence of prostate cancer per 100,000 population, by age group, Hispanic males of all races, Rhode Island, 1987-1995 and 1996-2003.*

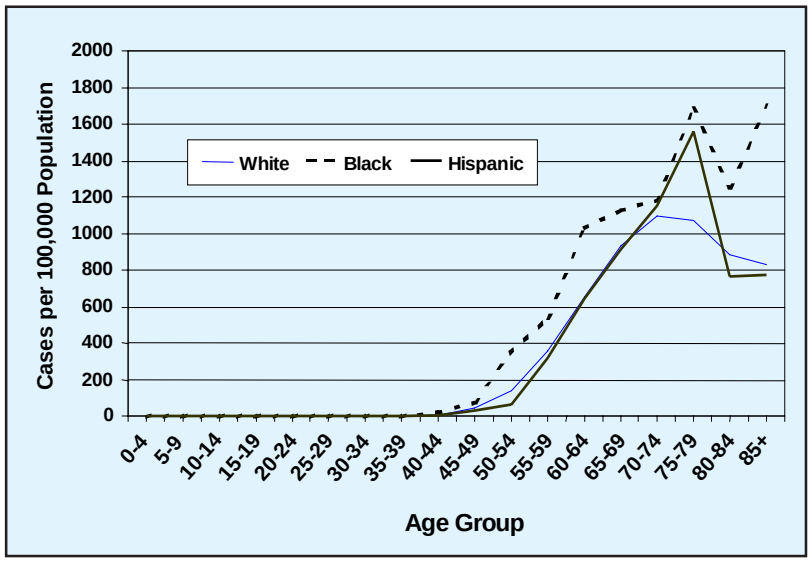

Figure 4. *Incidence of prostate cancer per 100,000 population, by age group and race/ethnicity, males, Rhode Island, 1996-2003.*

ethnicities (Figure 2) and Hispanic men of all races (Figure 3). In Rhode Island, Blacks and Hispanics have small numbers of men in the oldest age groups, accounting for the jagged shape of incidence rates by age among Black and Hispanic elders.

Figure 4 allows a closer comparison of incidence rates across sub-populations of resident Rhode Island men in the latter period of observation, 1996-2003. White men of all ethnicities and Hispanic men of all races (most of whom in Rhode Island are White), have almost identical age-specific incidence rates through ages 70-74. At older ages the small numbers of Hispanic men and of prostate cancer cases among Hispanic men obscure rate comparisons. In contrast to these two sub-populations of resident Rhode Island men, Black men of all ethnicities have higher age-specific rates throughout the lifespan (again, partially obscured by small numbers of Black men and of prostate cancer cases among Black men at older ages.)

Discussion. Rhode Island prostate cancer incidence data are consistent with rapid introduction of the PSA test in the late period of observation, 1996-2003, relative to PSA use in the early period of observation, 1987-1995. The data are also consistent with a "natural" increase in prostate cancer incidence, but several observations argue against the latter explanation as the only explanation. First, the PSA test is now being administered to about half of all Rhode Island men over the age of 40, enough for a substantial "screening effect." Second, prostate cancer incidence rates for the United States as a whole clearly reveal the heaping attributable to the rapid introduction of a screening test, superimposed on a mildly upward trend in "natural" prostate cancer incidence.

If it is indeed true that some substantial proportion of the observed shift to the left in age-specific rates is attributable to the rapid introduction of the PSA test, it is notable that Black men and Hispanic men under age 65 seem to have experienced the effects of screening as well as White men, because on average, Black and Hispanic Rhode Island men are less likely to have a regular source of primary care than White Rhode Island men.[8]

Finally, Hispanic Rhode Island men of all races (most of whom are White) appear to have the same age-specific prostate cancer incidence rates as White Rhode Island men of all ethnicities (of whom only about 10% are Hispanic), even after applying the Hispanic name algorithm to the data, which may err on the side of over-estimating Hispanic cancer incidence rates. In short, relative to White Rhode Island men of all ethnicities, Hispanic Rhode Island men of all races do not appear to be at higher risk of developing prostate cancer.

Screening for prostate cancer remains controversial. Although screening with the DRE and PSA is useful in detecting prostate cancer at early stages of disease, the net benefit of early intervention is unclear, and may not be determined for another decade. Yet, over half of Rhode Island men ages 40 and over have had a PSA test in the past two years, and screening has gained sufficient momentum, apparently, to have contributed to higher prostate cancer incidence rates at earlier ages. Careful local monitoring of screening outcomes is indicated, as is constant monitoring of the scientific literature on the effectiveness of prostate cancer screening.

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